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### (54) Plastic moulded crate provided with folding sides

(57) The present invention relates to a plastic moulded crate, of the type provided with folding sides, characterised in that, when in operational vertical posi-

tion, the sides are firmly joined by means of special lateral projecting elements (6) located on the transversal sides (1) that are fitted into corresponding slots (5) located on the longitudinal sides (3).

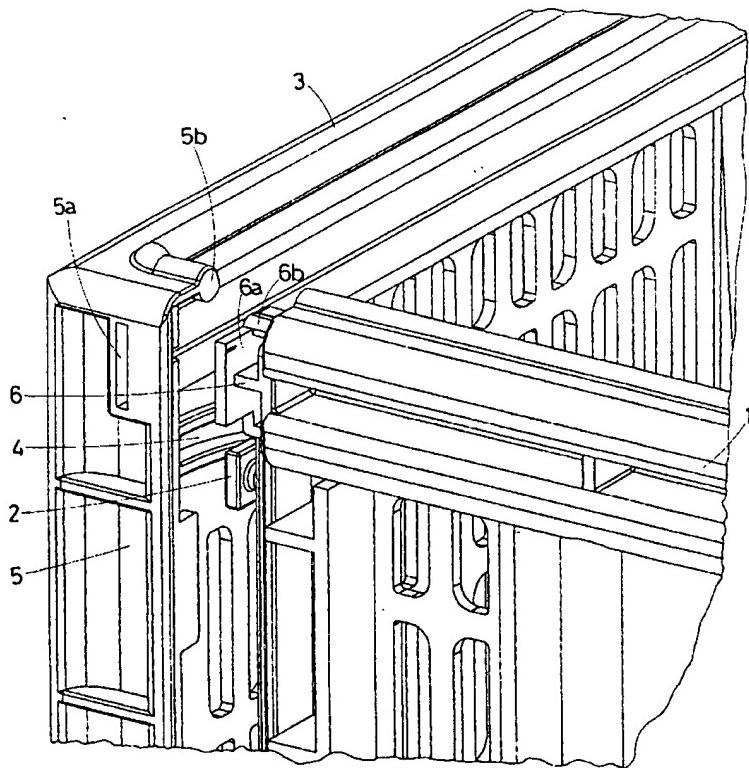


FIG. 2

**Description**

**[0001]** The present patent application relates to a plastic moulded crate, of the type provided with folding sides and especially effective means to firmly block the sides in operational vertical position.

**[0002]** Plastic moulded crates with four folding sides hinged on the edges of the horizontal bottom have been known for a long time. The possibility of folding the four sides on the bottom of the crate allows for reducing the volume of the crates during packing, stocking and transportation.

**[0003]** These crates are usually provided with suitable means to ensure the mutual firm fixing of the four sides, once the sides are placed in operational vertical position.

**[0004]** A version of this type of crates features transversal sides provided on each lateral edge with one or more pins with enlarged head capable of fitting and sliding in hooking slide guides located at the ends of the internal face of the longitudinal sides. Each guide has an ascending curvilinear profile since its beginning is located at a lower height and in more internal position with respect to its end, which practically coincides with the lateral edge of its longitudinal side.

**[0005]** As a matter of fact, the pins of the transversal sides must be inserted at the beginning of the guides located on the longitudinal sides, when the latter are already in vertical position, while the transversal sides are still tilted towards the horizontal bottom of the crane. When the transversal sides are rotated outwards, their pins start sliding in the slide guides. Finally, when the transversal sides have reached the operational vertical position, their pins firmly block at the end of the guides, thus ensuring the mutual blocking in place of the four sides of the crate.

**[0006]** In particular, the beginning of each guide located on the internal face of the longitudinal sides features a large hole, on which the enlarged head of the pin of the adjacent transversal side is fit.

**[0007]** Below the hole, the guide features a reduced cross-section along its curvilinear direction, in which the rod of the pin slides, with no possibility of extracting the enlarged head of the pin.

**[0008]** Near the end of the guide two opposite forks are located (one on each edge of the guide). When combined together, the forks have the structure and carry out the function of a jaw, which grips the rod of the pin of the adjacent transversal side, when the two consecutive sides (that is the longitudinal side with the guide and the transversal side with the pin) have reached the vertical position.

**[0009]** In particular, the rod of the pin is hooked by the jaw of the slide guide thanks to the forced introduction by the user to temporarily cause the elastic opening of the jaw in order to allow the pin to penetrate inside it and to remain blocked when the jaw returns to its natural position, once the deformation imposed on the jaw has

ceased.

**[0010]** Upon a practical verification, the crates with folding sides provided with a similar structure have shown a certain degree of structural instability when placed in operational position and loaded with quite considerable weights.

**[0011]** As a matter of fact, it has been proved that the stress caused by a similar operational use of the crates tend to cause excessive torsion deformation of the sides that are mutually fixed in vertical position, which easily tend to twist. The reason for the poor rigidity of the crate in operational position has been found in the insecure combination offered by the above mentioned fixing means, that is the pins located on the transversal sides, which are fitted into the guides located on the longitudinal sides.

**[0012]** The purpose of the present invention is to create a crate with folding sides, whose lateral sides are combined with the above mentioned system, but capable of fixing the four sides of the crate so as to provide the crate in operational position with effective structural stability and rigidity, by means of additional male and female hooking means of completely innovative type.

**[0013]** For major clarity the description according to the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration and not in a limiting sense, whereby:

- figure 1 is an axonometric view of two adjacent sides of the crate according to the invention, shown in operational position, but not mutually fixed yet;
- figure 2 is an enlarged detail of figure 1 which shows the male and female hooking means provided to obtain the stable mutual fixing of the adjacent sides of the crate.

**[0014]** With reference to the enclosed drawings, the crate according to the present invention usually features transversal sides (1) provided with a pin (2) with horizontal axis and enlarged head on each lateral edge (1a).

**[0015]** Each longitudinal side (3) features two grooved guides (4) with ascending curvilinear profile placed in useful position, each of them provided with a slot (4a) and the usual jaw (4b), capable of blocking the rod of the pin (2), located at the upper end of the guide (4) next to the lateral edge of the side (3). The peculiarity of the crate according to the invention is represented by the fact that the longitudinal sides (3) feature in each lateral edge almost for the entire height, a small border (5) positioned at 90°, whose upper part is provided with a slot (5a) with vertical axis. In particular, each border (5) has exactly the same height as the transversal sides (1).

**[0016]** The transversal sides (1) features a "T" projecting element (6) with the external wing (6a) placed edgeways on each lateral edge (1a) slightly above the pin (2).

**[0017]** The wing (6a) with vertical axis is placed on the

edge of the transversal side (1) in the same position as the slot (5a) on the end border (5) of the longitudinal side (3).

**[0018]** This means that, when the transversal side (1) is in vertical position - at the end of the back movement with respect to the adjacent longitudinal side that is already placed in vertical position - the vertical wing (6a) of the "T" projecting element (6) fits into the slot (5a) of the border (5) of the longitudinal side (3).

**[0019]** As a matter of fact, the mutual fitting of the projecting element (6) with the slot (5a) occurs simultaneously with the fitting of the rod of the pin (2) of the transversal side (1) into the end jaw (4b) of the guide (4) of the longitudinal side (3).

**[0020]** It is hardly necessary to say that, regardless of the schematic hypothesis illustrated in the enclosed figures, the back movement of each transversal side (1) up to the vertical position occurs between the two longitudinal sides (3) that are already in vertical position. This results in the simultaneous fitting of the two "T" projecting elements into the two slots (5a) of the borders (5) of the two opposite longitudinal sides (3) when the transversal side (1) has been completely raised.

**[0021]** Finally, it must be noted that the upper edge of the vertical wing (6a) features a central crest (6b) capable of interfering with a cylindrical tooth (5b) located on the upper edge of the border (5), in order to prevent the wing (6a) from being extracted freely from its slot (5a).

**[0022]** In other words, the elastic interference between the crest (6a) and the tooth (5b) causes the fitting of the wing (6a) into the tooth (5b) when completely introduced, so that the wing can be extracted only by forcing it out.

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of exactly fitting into the slot (5a) located on each border (5), while, at the same time, the central crest (6b) of the vertical wing (6a) is capable of elastically interfering with the tooth (5b) located in the upper edge of the border (5).

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## Claims

1. Plastic moulded crate with folding sides, of the type provided with transversal sides (1) with an horizontal pin (2) with enlarged head on each lateral edge (1a), capable of being fitted - with the possibility of sliding - into a grooved guide (4), with curvilinear profile and ascending direction, located in useful position on the internal face of the corresponding adjacent longitudinal side (3), characterised in that each longitudinal side (3) features - on each lateral edge and almost for the entire height - a small border (5) positioned at 90°, provided with a slot (5a) with vertical axis on the upper part and with a cylindrical tooth (5b) on the upper edge, while each transversal side (1) features on each lateral edge above the pin (2) a "T" projecting element with the external wing (6a) placed edgeways, with a central crest (6b) on its upper edge; it being provided that, when all the sides of the crate according to the invention have been placed in vertical position, the external wing (6a) of each "T" projecting element (6) provided on the transversal sides (1) is capable

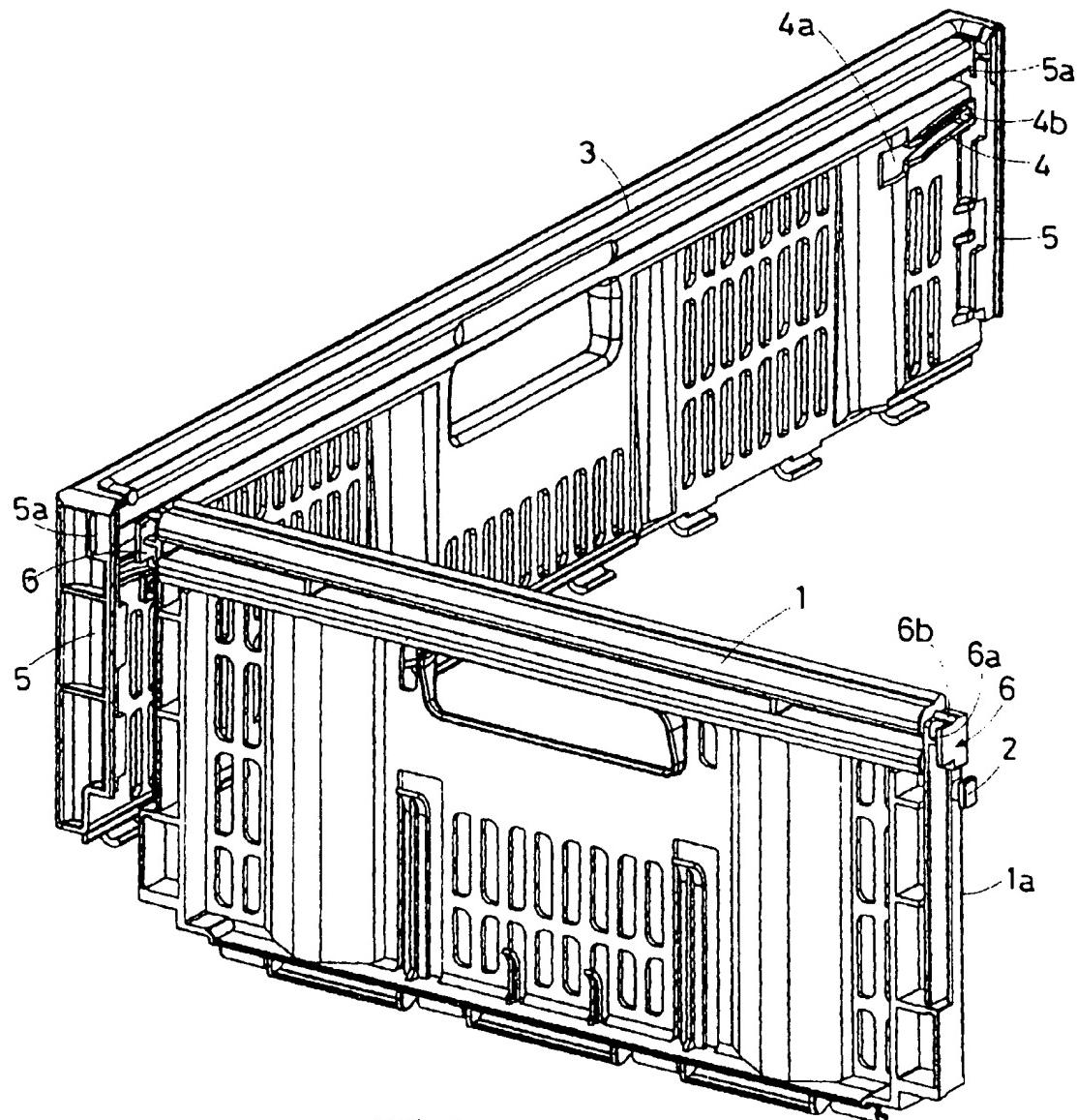


FIG. 1

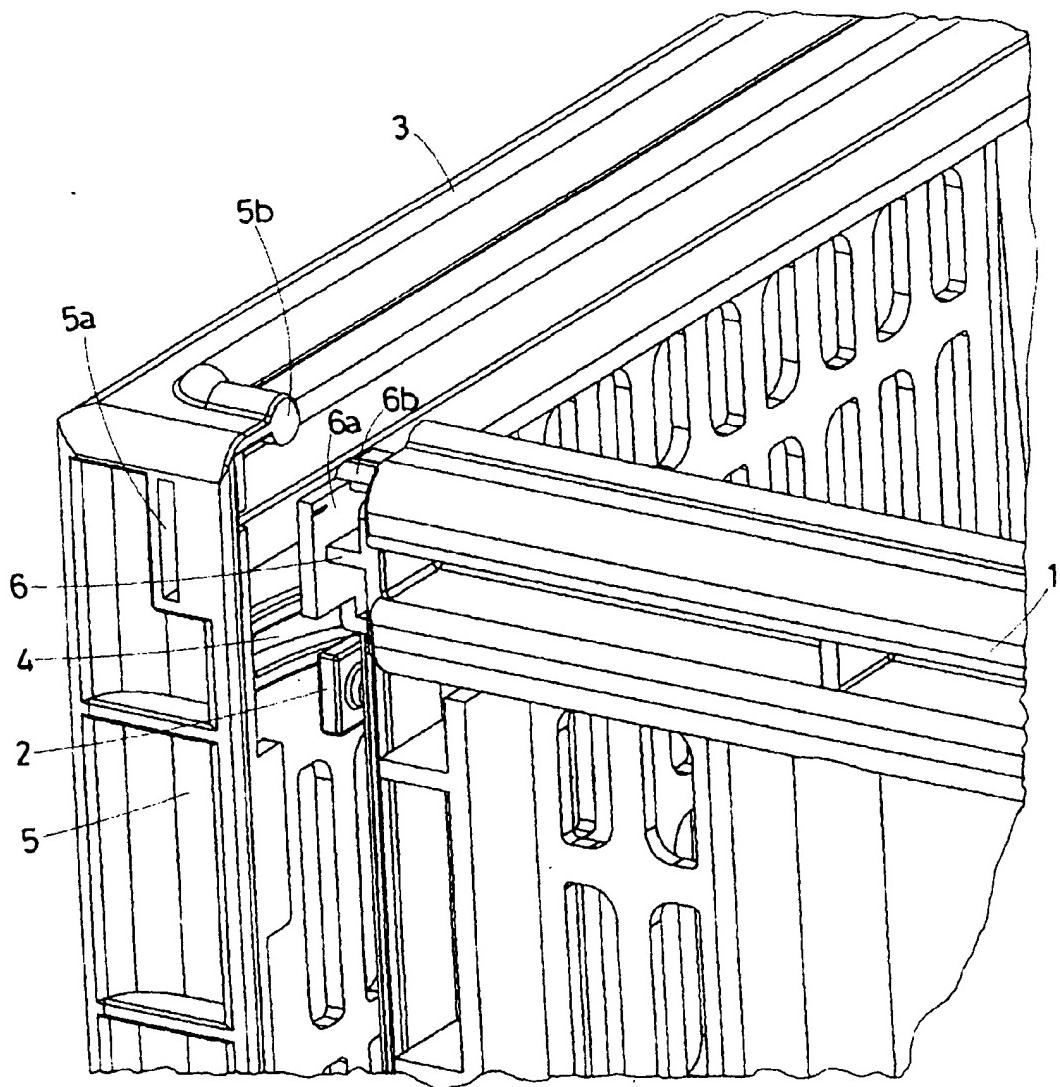


FIG. 2



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## EUROPEAN SEARCH REPORT

Application Number

EP 99 83 0291

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 690 003 A (OTTO INDUSTRIES) 3 January 1996 (1996-01-03) * page 4, line 19-26; figure 2 *	1	B65D6/18
A	WO 97 49613 A (SCHOELLER INTERNATIONAL ENGINEERING) 31 December 1997 (1997-12-31) * page 5, line 25-29; figure 1 *	1	
A	EP 0 785 142 A (TONTARELLI) 23 July 1997 (1997-07-23) * abstract; figures 1,2 *	1	
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	7 September 1999	Lenoir, C	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 99 83 0291

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-09-1999

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82.

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